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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF APPEALS AND THE INTERFERENCES

IN RE THE APPLICATION OF	)	
	)	Examiner: Tod Kupstas
BEVAN, A G et al	)	
	)	Group Art Unit No. 2153
SERIAL NO.: 09/385,938	)	
	)	
FILED: August 30, 1999	)	
	)	
FOR: Synchronisation Modelling Using Templates and Network Management System	)	

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450," on July 28, 2003.
Name of person signing Jennifer J. Ramirez
Signature

BRIEF ON APPEAL

This appeal is from the Examiner's final rejection of March 13, 2003 in which claims 1 to 13 were rejected. An appropriate response was filed on 16 May 2003 and a timely Notice of Appeal was mailed on June 4, 2003 with the required fee.

This brief is being filed in triplicate, with the required fee of $320.

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(1) Real Party in Interest

This application is assigned to Nortel Networks Corporation, now by change of name Nortel Networks Ltd., who is the real party in interest.

(2) Related Appeals and Interferences

There are no related appeals or interferences.

(3) Status of Claims

This application was filed with claims 1 through 6. Claims 3 and 4 were deleted and claims 7 to 13 were added in the applicant's response dated December 12, 2002. The remaining pending claims 1, 2 and 5 to 13 have been finally rejected by the Examiner. Claims 1, 2 and 5 to 13, as amended during the prosecution of the application, are appealed and are set forth in the appendix.

(4) Status of Amendments

No amendments have been proffered subsequent to the issuance of the Final Office Action of March 13, 2003. A response was filed on May 16, 2003 to the Final Office Action. This response was entered but was deemed by the Examiner as failing to place the present application in condition for allowance.

(5) Summary of Invention

The present invention relates to the provision of management data describing synchronization trail information for network elements in a communication network. The communication network comprises a plurality of such network elements, which might include switches, cross-connects, regenerators, repeaters, etc. The object of

synchronization is to keep the timing of network element clocks in step. Differences in timing at network elements will cause a receiving network element to either drop or re-read information sent to it. The synchronization may be provided by at least one Primary Reference Source (PRS) or Clock (PRC). A synchronization signal is generated at the PRS or PRC and passed through the network elements.

According to the present invention network element synchronization data is obtained. This synchronization data for a network element includes data about the active synchronization source for that network element (see page 7, lines 15 to 20, page 9, line 14 and page 12, lines 19 to 27 of the present application). In addition to the synchronization data, network element connectivity data is obtained. This connectivity data may be provided by a trail data base which stores data describing connections between trail termination points across layer networks and connections between termination points between layer networks (see page 6, lines 5 to 14, page 7, lines 22 to 25 and page 9, lines 16 to 18 of the present application). Then according to the present invention synchronization trail information for the network elements is computed from the synchronization data and the connectivity data. As described at page 10, line 11 to page 11, line 30 of the present application, this computation may be made by selecting a network element of the network and computing a synchronization trail based on the synchronization data and connectivity data from that network element to its synchronization source. All network elements along the synchronization trail are tagged. Then a next network element, which has not been tagged, is selected and its synchronization trail is computed, again with network elements in the trail being tagged. This process is continued until all network elements are tagged. If a synchronization trail ends up with a PRS or PRC, then all network elements in the synchronization trail are appropriately synchronized and are labelled OK, provided the number of network elements in the trail are below a threshold number. If a synchronization trail is not traceable to a PRS or PRC, then all network elements in the trail are labelled ISLAND. If a synchronization trail is traceable back to a network element already in the synchronization trail then the

network elements in the synchronization trail are labelled LOOP, etc. For improved efficiency network elements at the 'edge' of the network, so called leafNodes are preferentially selected as starting points for computing synchronization trails.

Referring to the example provided in Figure 6 of the present application, considering F as the starting network element for a synchronization trail, based on the synchronization data and connectivity data, the synchronization trail can be computed as follows F to E to D to C to G to F. As F is already in the synchronization trail then network nodes C to G are labelled LOOP (see page 11, line 35 to page 12, line 4). Referring to the example provided in Figure 7 of the present application, considering E as the starting network element for a synchronization trail, based on the synchronization data and connectivity data, the synchronization trail is computed as follows E to K to L to PRC, so network elements E, K and L are tagged and labelled as OK. The next synchronization trail may start from network element D which is traced back to network element E which is already tagged and labelled as OK and so the computation is stopped and the network element D is tagged and labelled as OK. The next synchronization trail may start from network element C which is traced back to network element K which is already tagged and labelled as OK and so the computation is stopped and the network element C is tagged and labelled as OK. This series of computations proceeds until all the network elements are tagged.

(6) Issues

Three issues are presented:

Claims 1 to 5, 7 and 13 (actually, 1, 2, 5, 7 and 12) are rejected under 35 U.S.C. §102(e), as allegedly 'being anticipated by Wolf (US6,081,550)'.

Claims 6, 11 and 12 are rejected under 35 U.S.C. §103(a) as allegedly 'being unpatentable over Wolf (US6,081,550) in view of French et al (US6,330,601)'.

Claims 8 to 10 are rejected under 35 U.S.C. §103(a) as allegedly 'being unpatentable over Wolf (US6,081,550) in view of Meier (US6,400,702)'.

(7) Grouping of Claims

Claims 1, 5, 7 and 13 can be considered as a first claim grouping, claim 2 can be considered as a second claim grouping, claims 6, 11 and 12 can be considered as a third claim grouping, and claims 8 -10 can be considered as a fourth claim grouping.

(8) Argument

Claims 1 to 5, 7 and 13 (actually 1, 2, 5, 7 and 12) are rejected under 35 U.S.C. §102(e), as allegedly 'being anticipated by Wolf (US6,081,550)'

The Examiner alleges that sections of Wolf indicate how phase modulation is used to determine if an intact clock path exists, and that these sections indicate a full disclosure of 'synchronization trail information'. Wolf teaches that information about a prior designated clock path is obtained by physical testing of network nodes (elements) in that clock path. From the results of the physical tests deductions are made about the functioning of the clock path, possibly resulting in further physical testing on network nodes in the clock path (see col 3, line 12 to col 5, line 4 in relation to Figures 1a to 1d of Wolf). In Wolf, if the physical tests show that the designated clock path is not functioning, exhaustive further testing has to be carried out as described at col 4, lines 30 to 48 of Wolf. It is submitted that this process of physical testing, deductions made from such physical testing, possibly resulting in further physical testing is a different approach to 'computing synchronization trail information for network elements from said synchronization data and said

connectivity data'. The process of physical testing, deductions made therefrom, and further testing is not a computation from collected data. The present invention enables synchronization trail information to be computed from collected classes of data and so enables the automation of the provision of synchronization trail information.

The Examiner alleges that Wolf provides full disclosure of 'synchronization trail information' and characterizes this information as the clock path and information about that path. However, the testing method taught in Wolf requires prior knowledge of a designated clock path, so that a designated clock path, for example that shown in Figure 1a, can be end-to-end tested. Wolf in no way describes how this prior knowledge of the clock path is obtained and so cannot provide a full disclosure of 'synchronization trail information'.

Claim 1 of the present application describes a method, the first step of which is obtaining network element synchronization data. Examples of such data are described in the present application for example, at page 7, lines 15 to 20, page 9, line 14 and at page 12, lines 19 to 27. Such data is not obtained in relation to the network elements in Wolf for any purpose and so is not obtained for computing synchronization trail information. Instead, in Wolf a marked signal is passed along a designated clock path and one or more selected network elements in the clock path are checked to see if they carry the marked signal in order to deduce information about the functioning of the designated clock path. The second step in the method of claim 1 is obtaining network element connectivity data. Examples of such data are described in the present application, for example, at page 6, lines 5 to 14, page 7, lines 22 to 25 and page 9, lines 16 to 18. Such data is not obtained in relation to the network elements in Wolf. In Wolf, by some means not disclosed, a designated clock path to be tested is already identified. Wolf does not describe these classes of data. Consequently, Wolf does not disclose a computation of synchronization trail information from such data.

To summarize in relation to claim 1, Wolf does not describe the steps of obtaining network element synchronization data or of obtaining network element connectivity data. In Wolf a prior knowledge of a designated clock path is assumed, but it is nowhere taught in Wolf how this prior knowledge is gained. As set out above Wolf does not describe a computation of synchronization trail information from such data, it only describes physical testing based on an already known clock path and the making of deductions based on the results of the tests, possibly leading to further such physical tests.

Accordingly, it is submitted that claim 1 of the present application is not anticipated by Wolf. It is also submitted, given the above arguments, that the teaching in Wolf does not in any way make claim 1 of the present application obvious.

With reference to claim 2, Wolf does not describe or in any way teach a protocol having a timing layer for representing synchronization trail information. Wolf teaches that deductions can be made about a pre-determined clock path or synchronization trail by applying a physical test to a network. Wolf does not teach the existence of synchronization information inherent in the network and so no timing layer for representing synchronization trail information can be implied.

Accordingly, it is submitted that claim 2 of the present application is not anticipated by Wolf. It is also submitted, given the above arguments, that the teaching in Wolf does not in any way make claim 2 of the present application obvious.

Claims 3 and 4 were deleted by the applicants without prejudice in the response filed December 12, 2002, and are, therefore, not in issue.

In relation to claims 5 and 13, the arguments set out in relation to claim 1 above apply.

Claim 7 is dependent on claim 1 and so, based on the arguments set out above, it is submitted that it is not anticipated by Wolf.

In particular, in relation to claim 7, with reference to Figure 1a at col 3, lines 39-44, one example of the physical test taught by Wolf is described. The reference clock of a first network element NE1 is marked and this mark is detected at a network element NE8, after the marked signal has passed sequentially from NE1 to NE8. However, it is the starting network element NE1 which is adjacent to the synchronization source (PRC) in Figure 1a of Wolf. So in Wolf the marked signal is passed away from and not towards the synchronization source. According to claim 7, a synchronization trail is followed to its synchronization source. In any case, the passing of the marked signal from NE1 to NE8 is not in any way equivalent to 'following the synchronization trail.....using said synchronization data and said connectivity data'. As argued above, Wolf does not disclose the obtaining of such data or its use in relation to computing or following synchronization trails.

Claims 6, 11 and 12 are rejected under 35 U.S.C. §103(a) as allegedly 'being unpatentable over Wolf (US6,081,550) in view of French et al (US6,330,601)'

In relation to claim 6, as argued above, it is submitted that Wolf does not teach or disclose the obtaining of network element synchronization data, the obtaining of network element connectivity data, the computation of synchronization trail information from said data or the following of the trail to the synchronization source of a network element. French relates to a management system for a multi-level communication network which is described as having a graphical user interface (GUI). The graphical user interface can present necessary information to an operator on a display device for viewing information about networks. However, the main aspect taught by French is an interface module permitting a first network level management system to represent at least two logical levels of a multi-level

communication system. The synchronization manager (340) referred to in French is for synchronizing data between the Management Information Bases (MIBs) (See col 6, line 53 to col 7, line 5). French does not relate to synchronization trails. Given the above, the combined teaching of Wolf and French would not lead a person skilled in the art towards the present invention as claimed in claim 6.

In relation to claims 11 and 12, these claims are dependent on claim 1 and based on the arguments above it is submitted that neither Wolf or French separately or in combination teach the feature of claim 1.

Accordingly, it is submitted that claims 6, 11 and 12 are patentable over Wolf in view of French.

Claims 8 to 10 are rejected under 35 U.S.C. §103(a) as allegedly 'being unpatentable over Wolf (US6,081,550) in view of Meier (US 6,400,702)'

Meier relates to the organization of base stations in a radio data communications system into an optimal spanning tree network so as to control routing. It does not relate to synchronization trail information.

Firstly, claims 8 to 10 are dependent on claim 1 and it is submitted that based on arguments above claim 1 is patentable over Wolf and Meier either separately or in combination.

In relation to claim 8, Meier describes an initialization process in an RF data communication system in which nodes are organized into an optimal spanning tree rooted at a gateway (col 6, lines 6 to 8). The gateway is called a root node (col 6, lines 11 to 13). The gateway node periodically sends a polling packet referred to as a 'hello' packet. The hello packets do not include or relate in any way to trail synchronization (see col 6, lines 25 to 28). The sending of the hello packets enables

the root node to determine which nodes are attached to the spanning tree (col 6, lines 36 to 38). Meier in no way relates to synchronization trail information. The Examiner indicates that Meier teaches starting such trails at leafNode elements. Meier does not mention leafNodes nor anything like them. The 'hello' packets are not preferentially sent out to nodes at the edge of the spanning tree (which might be considered equivalent to leafNodes) but to all nodes in the spanning tree. Accordingly, Meier in no way describes or teaches preferentially selecting leafNode network elements as a start of a synchronization trail.

In relation to claim 9, when applying the physical test taught in Wolf to a designated clock path, the clock path along which the marked signal is to be sent is already known. There is no discussion in Wolf of the tagging of network elements via which the marked signal is passed. In the use of the ad hoc tests taught in Wolf according to the process of testing, deductions and possible further testing, there is no reason to tag network elements via which a marked signal has passed. The Examiner's statement that it is implied in Wolf that the elements in the network are tagged and kept track of when the trail is being traced and that it is implied that tags are discarded after a count, is strongly refuted.

In relation to claim 10, Meier describes the measurement of the distance of nodes in the spanning tree from the root node as being measured in hops times (ie. multiplied by) the bandwidth of each hop (see col 6, lines 31 to 33). This distance measurement in Meier does not relate to synchronization trail information and in any case is different from the feature of claim 10 of the present invention in which the number of hops from a network element at the start of a synchronization trail to a primary reference clock are simply counted.

Accordingly, it is submitted that claims 8 - 10 are patentable over Wolf in view of Meier.

Conclusion

It is therefore submitted that the claims, as set forth in the Appendix, are patentable, and are allowable over the prior art. Reversal of the final rejection is therefore solicited.

July 25, 2003

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Appendix

Pending claims, as amended during the prosecution of the application

1. In a communications network comprising a plurality of network elements, a method of providing management data describing synchronization trail information for said network elements, said method comprising the steps of:

   obtaining network element synchronization data;

   obtaining network element connectivity data; and

   computing synchronization trail information for said network elements from said synchronization data and said connectivity data.

2. A data representation of a physical resource operating in accordance with a protocol having a plurality of layers, the representation further comprising a timing layer representing synchronization trail information.

5. A method of exploring synchronization trails within a network comprising a plurality of network elements, the method comprising the steps of:

   obtaining network element synchronization data;

   obtaining network element connectivity data; and

   computing synchronization trail information for a network element and the trail to the synchronization source of the element, using said synchronization data and said connectivity data.

6. A method of displaying information relating to synchronization trails within a network comprising a plurality of network elements, said method comprising:

   obtaining network element synchronization data;

   obtaining network element connectivity data;

   computing synchronization trail information for said network elements from said synchronization data and said connectivity data;

   and

for each synchronization trail, displaying in graphical form the synchronization trail information from a network element and following the trail to a synchronization source of the element.

7. A method according to claim 1 wherein computing the synchronization trail information comprises the steps of:

   selecting a network element as a start of a synchronization trail; and

   following the synchronization trail to the synchronization source of the network element using said synchronization data and said connectivity data.

8. A method according to claim 1 wherein computing the synchronization trail information comprises the steps of preferentially selecting leafNode network elements of the network as a start of a synchronization trail.

9. A method according to claim 1 wherein computing the synchronization trail information comprises the steps of:

   preferentially selecting leafNode network elements of the network as a start of a synchronization trail;

   following the synchronization trail to the synchronization source of the selected network element using said synchronization data and said connectivity data;

   tagging all the network elements involved in synchronization trails as they are followed; and

   discarding tagged network elements as the start of subsequent synchronization trails.

10. A method according to claim 1 wherein computing the synchronization trail information comprises the steps of:

counting the number of hops from a network element at the start of synchronization trail to a primary reference clock.

11. A method according to claim 1 wherein computing the synchronization trail information comprises the steps of:

labelling a network element as 'OK' if the synchronization trail containing that network element ends in a primary reference clock.

12. A method according to claim 1 wherein computing the synchronization trail information comprises the steps of:

labelling a network element as 'ISLAND' if the synchronization trail containing that network element does not end in a primary reference clock; and

labelling a network element as 'LOOP' if the synchronization trail is traced back to a network element already in the synchronization trail.

13. A system for providing management data describing synchronization trail information for network elements in a communications network comprising a plurality of said network elements, comprising:

means for obtaining network element synchronization data;

means for obtaining network element connectivity data; and

means for computing synchronization trail information for said network elements from said synchronization data and said connectivity data.